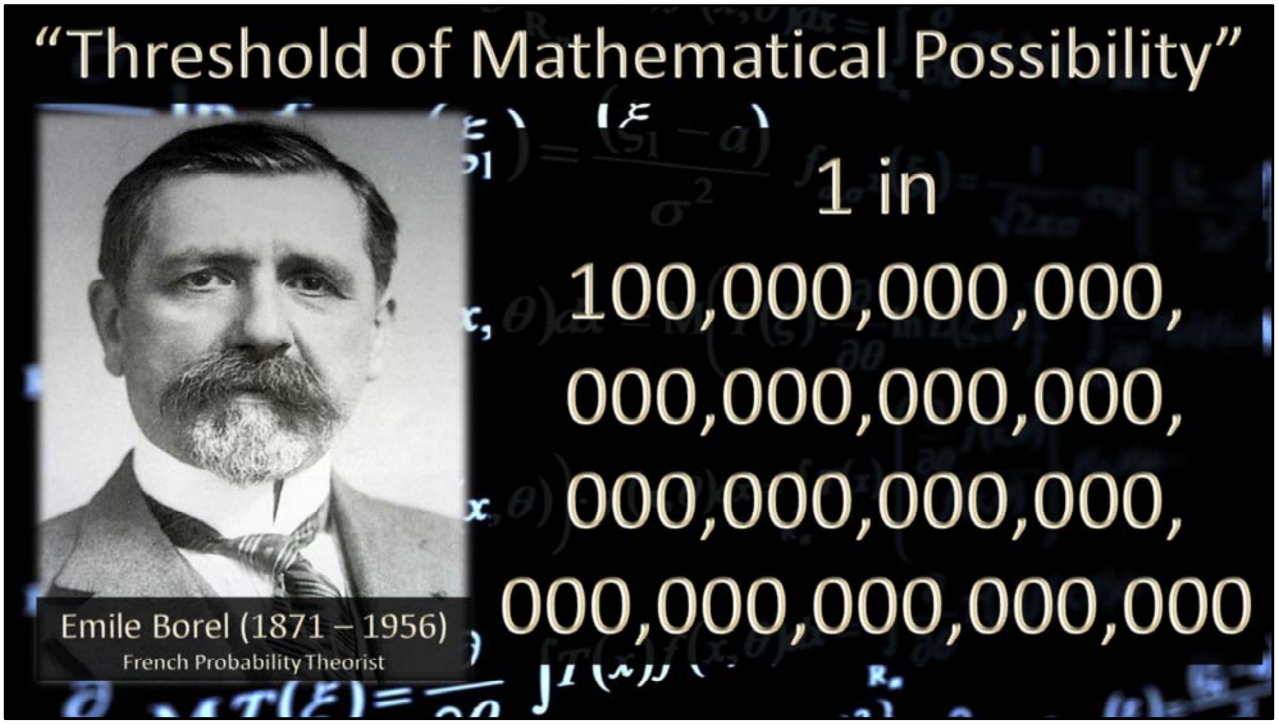

“Threshold of Mathematical Possibility”

Emile Borel (1871 – 1956)
French Probability Theorist

1 in
100,000,000,000,
000,000,000,000,
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000,000,000,000,000

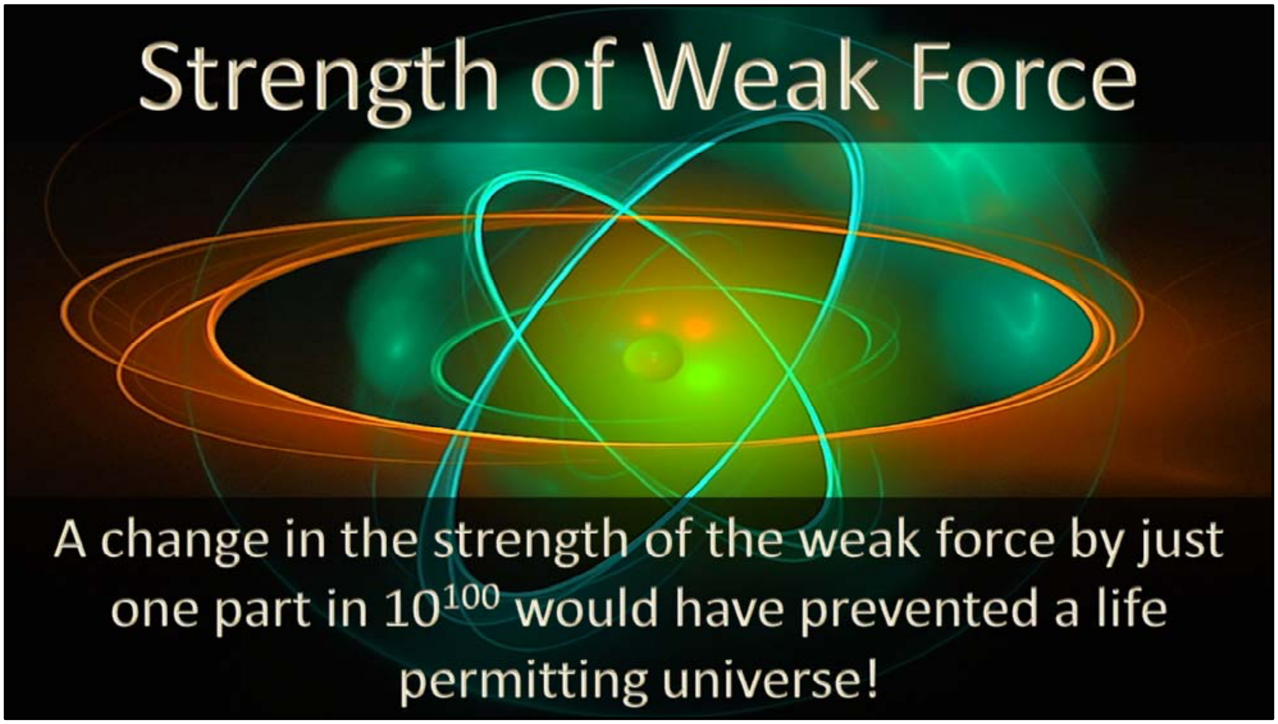
And in fact, it appears there is a point at which the odds of something occurring effectively become zero.

A French probability theorist by the name of Emile Borel calculated what is sometimes called “the threshold of mathematical possibility” in the year 1909. That number is 1 in 10 to the 50th power.

So with that in mind, lets take a look at how precisely tuned some of the constants of nature had to be in order for life to exist in our universe…

Strength of Gravity

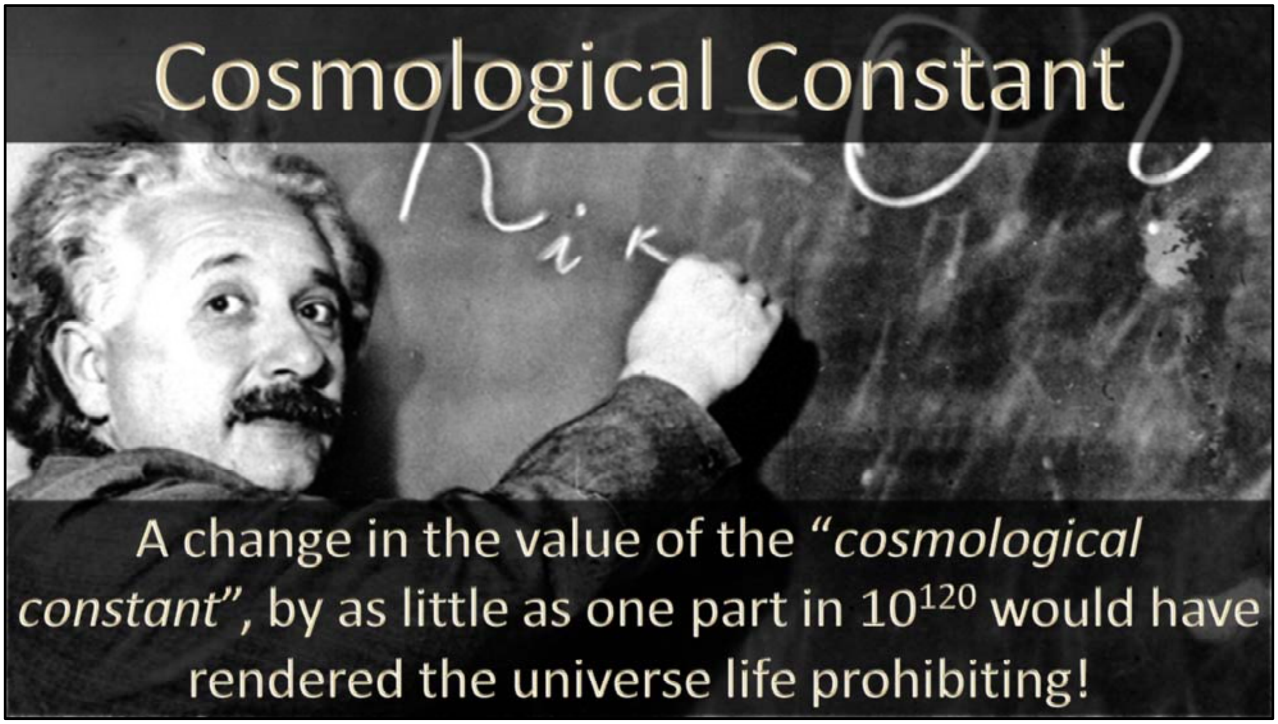
A change in the strength of the force of gravity by just one part in 10^{100} would have prevented a life permitting universe!



Strength of Weak Force

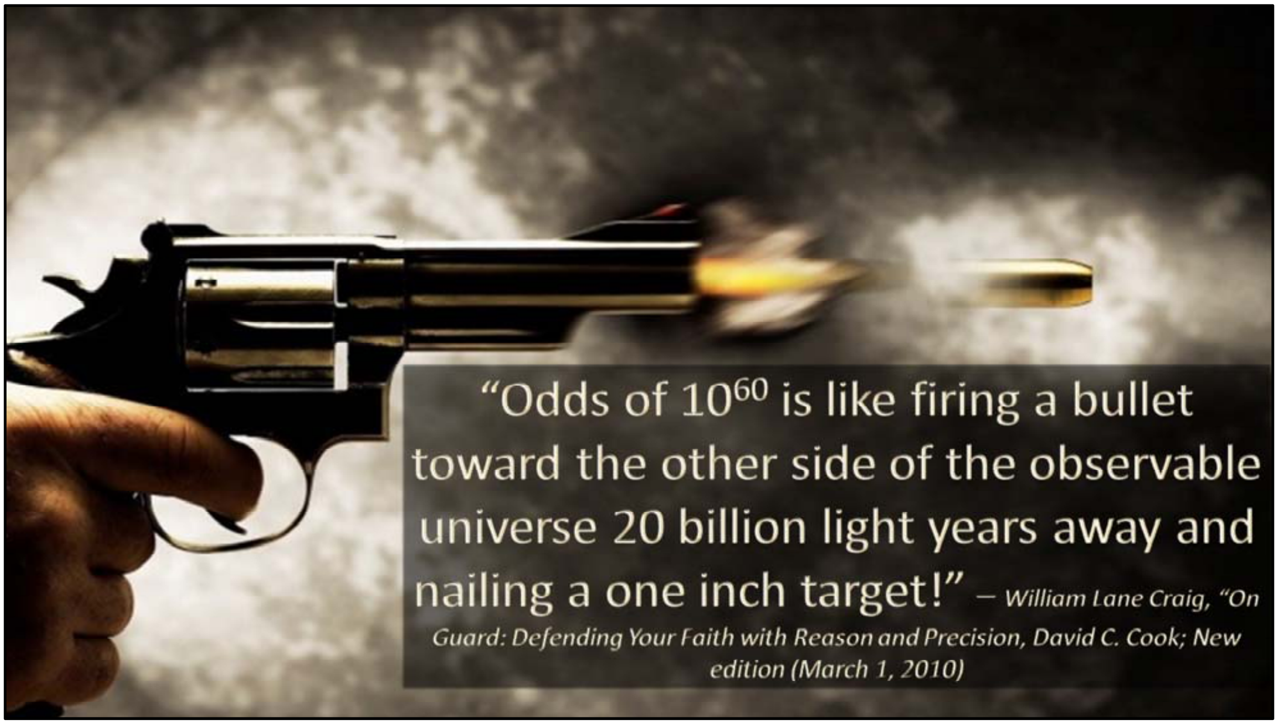
A change in the strength of the weak force by just one part in 10^{100} would have prevented a life permitting universe!

The so-called weak force, one of the four fundamental forces of nature, which operates inside the nucleus of an atom, is so finely tuned that an alteration in its value by even one part out of 10^{100} would have prevented a life-permitting universe!



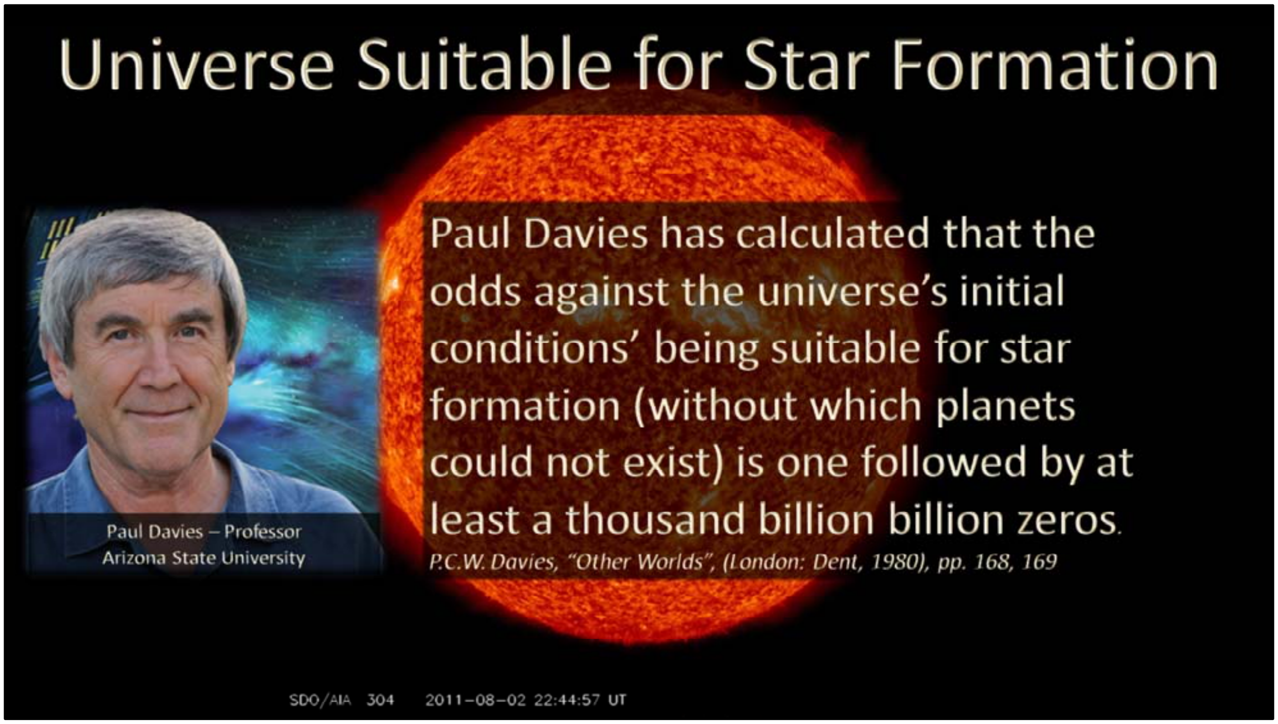
Cosmological Constant

A change in the value of the "*cosmological constant*", by as little as one part in 10^{120} would have rendered the universe life prohibiting!



“Odds of 10^{60} is like firing a bullet toward the other side of the observable universe 20 billion light years away and nailing a one inch target!” – *William Lane Craig, “On Guard: Defending Your Faith with Reason and Precision, David C. Cook; New edition (March 1, 2010)*

The fine tuning here is beyond comprehension. Having an accuracy of even one part out of 10 to the 60th power is like firing a bullet toward the other side of the observable universe, twenty billion light-years away, and nailing a one inch target.



Universe Suitable for Star Formation

Paul Davies – Professor
Arizona State University

Paul Davies has calculated that the odds against the universe's initial conditions' being suitable for star formation (without which planets could not exist) is one followed by at least a thousand billion billion zeros.

P.C.W. Davies, "Other Worlds", (London: Dent, 1980), pp. 168, 169

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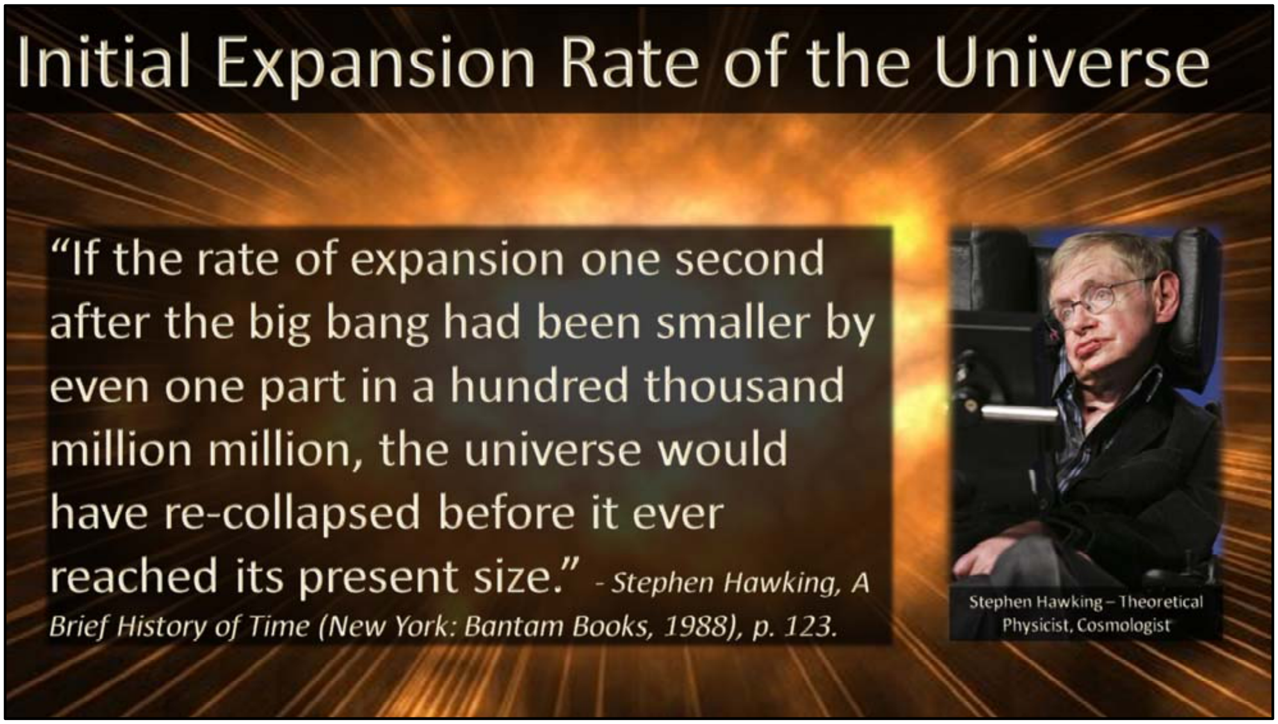
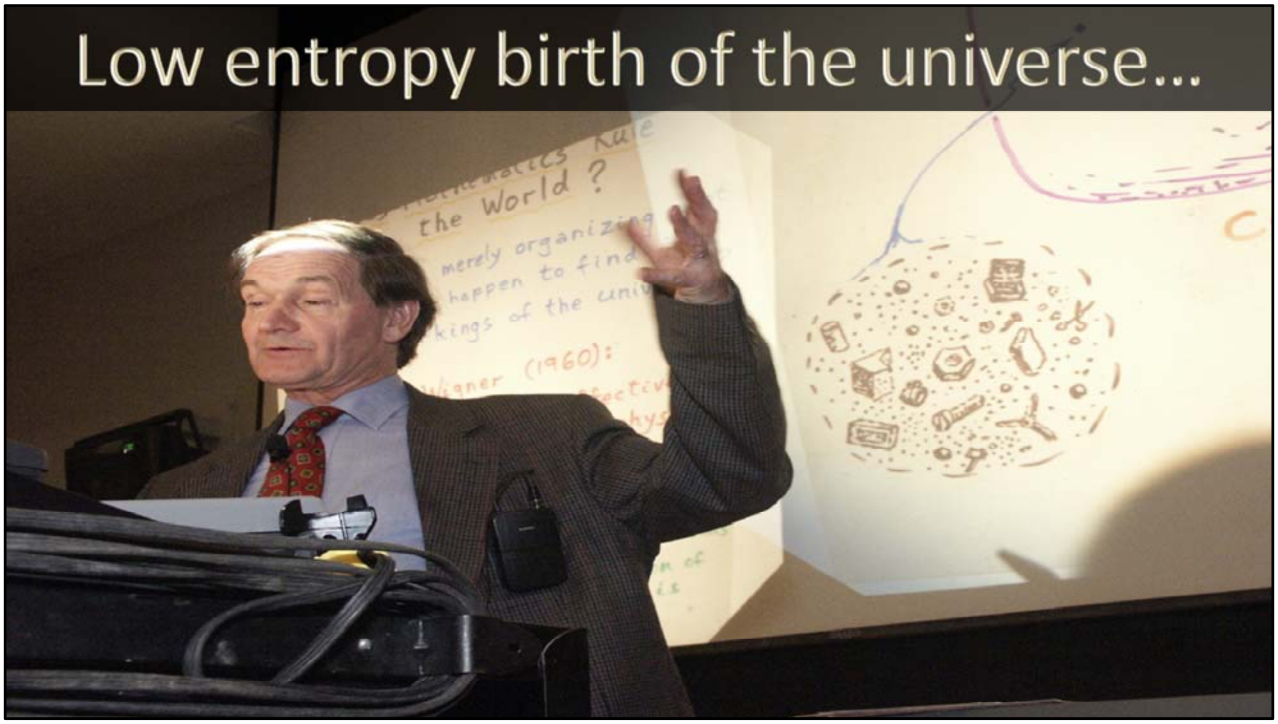
Paul Davies, an English physicist, writer and professor at Arizona State University has calculated that the odds against the initial conditions of the universe being suitable for later star formation (without which planets could not exist) is one followed by a thousand billion billion zeros, at least.



Initial Expansion Rate of the Universe

"If the rate of expansion one second after the big bang had been smaller by even one part in a hundred thousand million million, the universe would have re-collapsed before it ever reached its present size." *- Stephen Hawking, A Brief History of Time (New York: Bantam Books, 1988), p. 123.*

Stephen Hawking – Theoretical Physicist, Cosmologist



Low entropy birth of the universe...

Scientists have been baffled as to why the universe had such a low level of entropy at the moment of creation. It’s simply something that the laws of physics cannot adequately explain. Frankly, is should not have occurred.

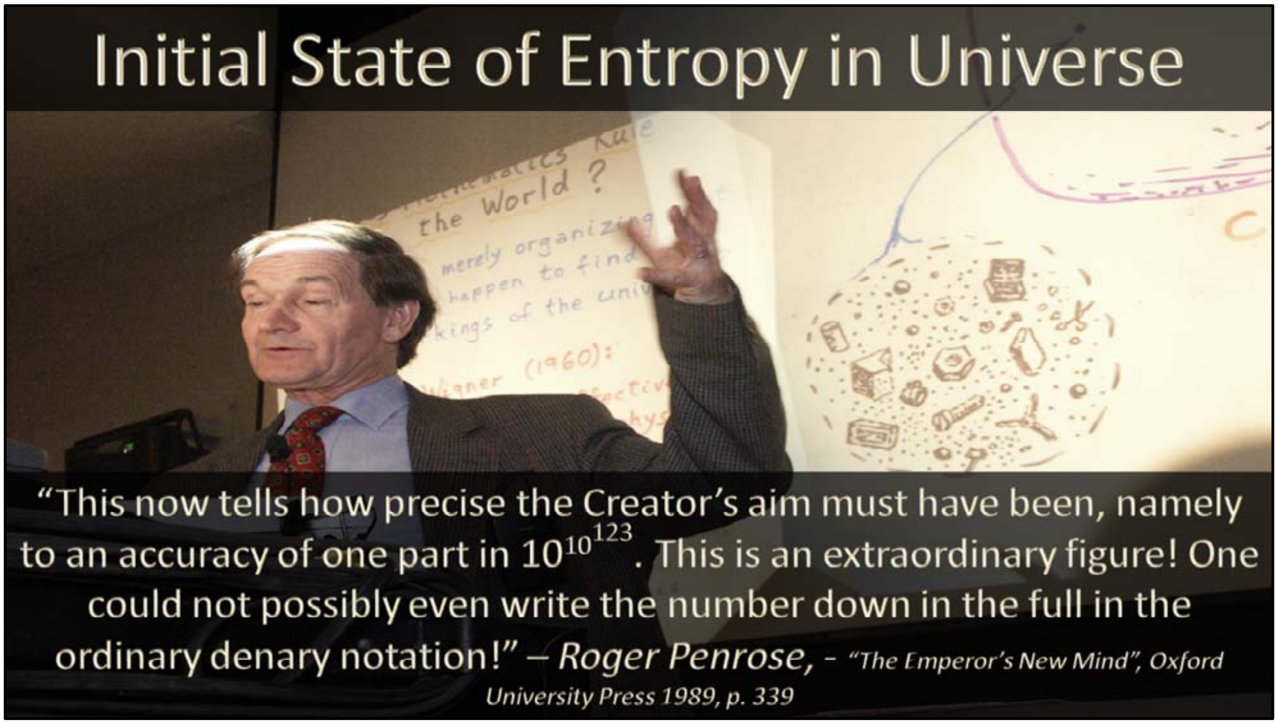
Roger Penrose, one of the world’s leading scientists and professor of physics at Oxford University has calculated the odds of the universe being born in such a low state of entropy.

His calculation is widely accepted and acknowledged by the world’s scientific community.

Odds of this occurring by chance…

$1 \text{ in } 10^{10^{123}}$!

His findings show that the odds of this low entropy birth state of the universe existing by chance alone is on the order of 1 in 10 to the 10th power, to the 123rd power, a number that is so inconceivable that to call it astronomical would be wildly understated!



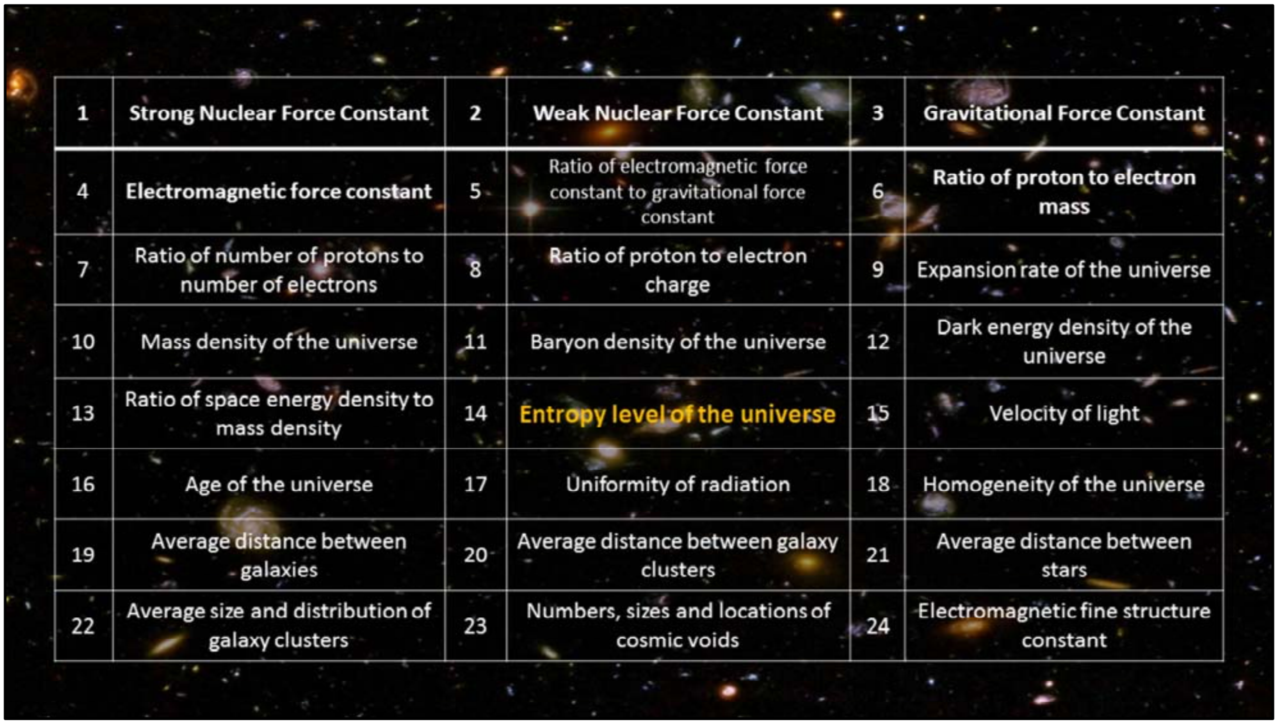
the World ?
merely organizing
happen to find
kings of the univ
Wigner (1960):

Initial State of Entropy in Universe

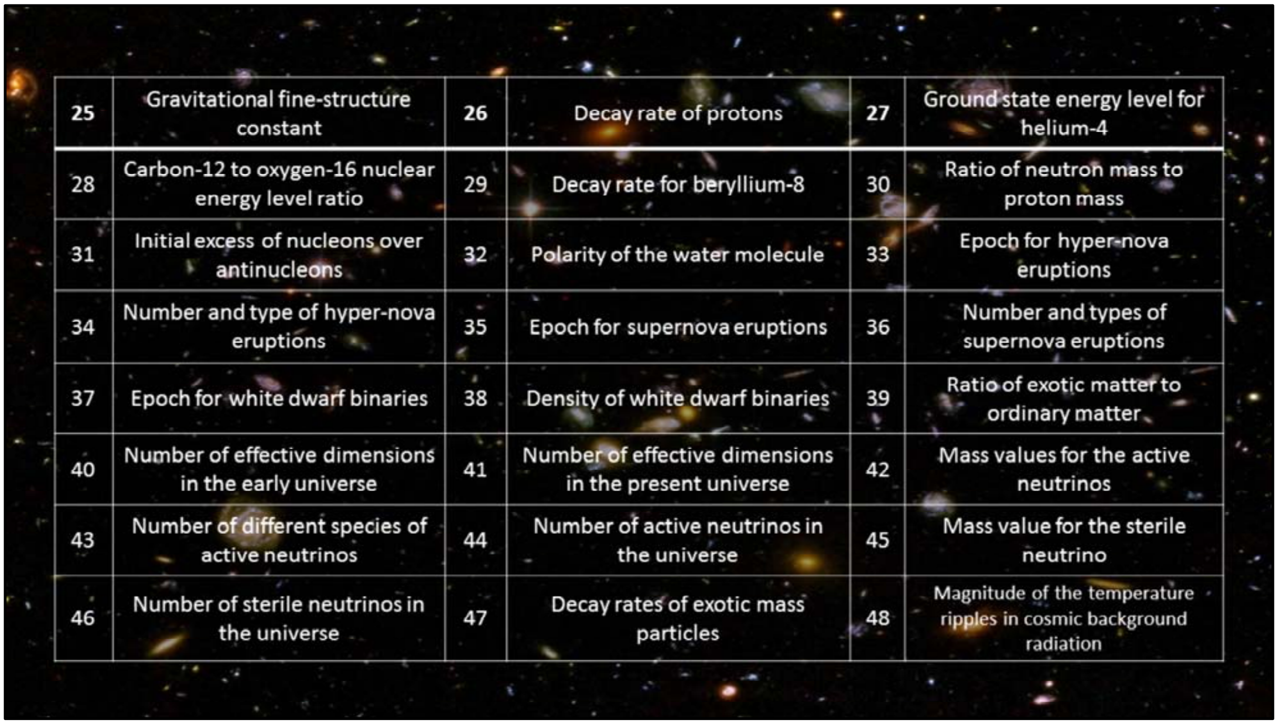
"This now tells how precise the Creator's aim must have been, namely to an accuracy of one part in $10^{10^{123}}$. This is an extraordinary figure! One could not possibly even write the number down in the full in the ordinary denary notation!" – *Roger Penrose*, - *"The Emperor's New Mind", Oxford University Press 1989, p. 339*

In his book, "The Emperor's New Mind," Roger Penrose is quoted as saying…

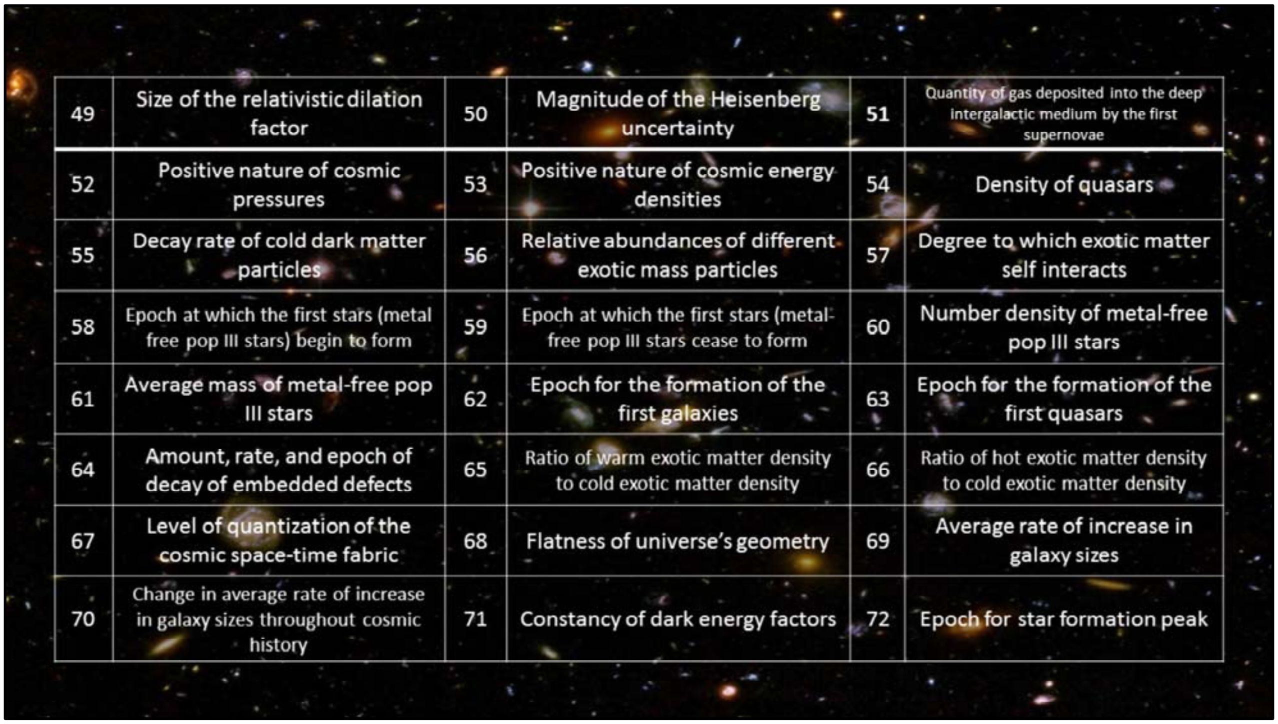
And, he's right about not being able to even write this number down. For, if we were to write the odds of this out in standard notation, we would have to write out the odds as 1 in 1, followed by more zeroes than the total number of sub-atomic particles that exist in the entire observable universe! If we wrote the number down in 10 point type, we would literally require an area large enough, that it would take up most of the observable universe! We simple cannot fathom such numbers.



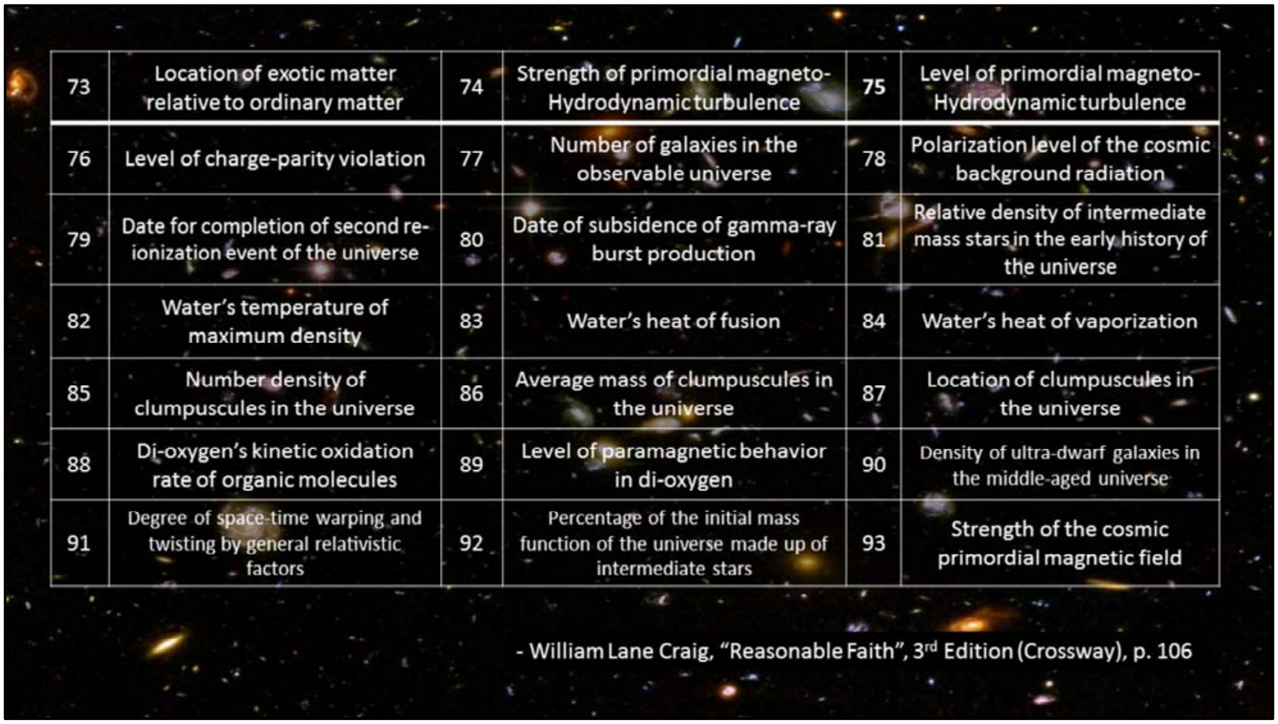
1	**Strong Nuclear Force Constant**	2	**Weak Nuclear Force Constant**	3	**Gravitational Force Constant**
4	**Electromagnetic force constant**	5	Ratio of electromagnetic force constant to gravitational force constant	6	**Ratio of proton to electron mass**
7	Ratio of number of protons to number of electrons	8	Ratio of proton to electron charge	9	Expansion rate of the universe
10	Mass density of the universe	11	Baryon density of the universe	12	Dark energy density of the universe
13	Ratio of space energy density to mass density	14	**Entropy level of the universe**	15	Velocity of light
16	Age of the universe	17	Uniformity of radiation	18	Homogeneity of the universe
19	Average distance between galaxies	20	Average distance between galaxy clusters	21	Average distance between stars
22	Average size and distribution of galaxy clusters	23	Numbers, sizes and locations of cosmic voids	24	Electromagnetic fine structure constant



25	Gravitational fine-structure constant	**26**	Decay rate of protons	**27**	Ground state energy level for helium-4
28	Carbon-12 to oxygen-16 nuclear energy level ratio	29	Decay rate for beryllium-8	30	Ratio of neutron mass to proton mass
31	Initial excess of nucleons over antinucleons	32	Polarity of the water molecule	33	Epoch for hyper-nova eruptions
34	Number and type of hyper-nova eruptions	35	Epoch for supernova eruptions	36	Number and types of supernova eruptions
37	Epoch for white dwarf binaries	38	Density of white dwarf binaries	39	Ratio of exotic matter to ordinary matter
40	Number of effective dimensions in the early universe	41	Number of effective dimensions in the present universe	42	Mass values for the active neutrinos
43	Number of different species of active neutrinos	44	Number of active neutrinos in the universe	45	Mass value for the sterile neutrino
46	Number of sterile neutrinos in the universe	47	Decay rates of exotic mass particles	48	Magnitude of the temperature ripples in cosmic background radiation

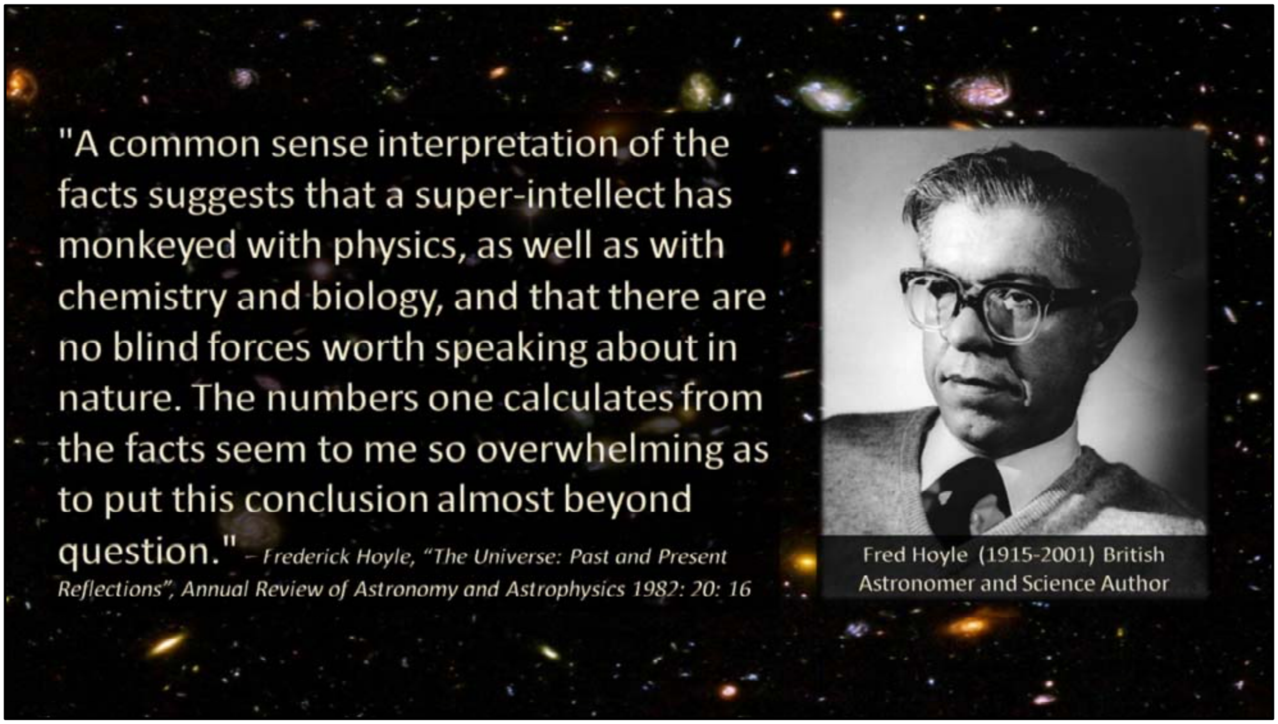


49	Size of the relativistic dilation factor	50	Magnitude of the Heisenberg uncertainty	51	Quantity of gas deposited into the deep intergalactic medium by the first supernovae
52	Positive nature of cosmic pressures	53	Positive nature of cosmic energy densities	54	Density of quasars
55	Decay rate of cold dark matter particles	56	Relative abundances of different exotic mass particles	57	Degree to which exotic matter self interacts
58	Epoch at which the first stars (metal free pop III stars) begin to form	59	Epoch at which the first stars (metal-free pop III stars cease to form	60	Number density of metal-free pop III stars
61	Average mass of metal-free pop III stars	62	Epoch for the formation of the first galaxies	63	Epoch for the formation of the first quasars
64	Amount, rate, and epoch of decay of embedded defects	65	Ratio of warm exotic matter density to cold exotic matter density	66	Ratio of hot exotic matter density to cold exotic matter density
67	Level of quantization of the cosmic space-time fabric	68	Flatness of universe's geometry	69	Average rate of increase in galaxy sizes
70	Change in average rate of increase in galaxy sizes throughout cosmic history	71	Constancy of dark energy factors	72	Epoch for star formation peak



73	Location of exotic matter relative to ordinary matter	74	Strength of primordial magneto-Hydrodynamic turbulence	75	Level of primordial magneto-Hydrodynamic turbulence
76	Level of charge-parity violation	77	Number of galaxies in the observable universe	78	Polarization level of the cosmic background radiation
79	Date for completion of second re-ionization event of the universe	80	Date of subsidence of gamma-ray burst production	81	Relative density of intermediate mass stars in the early history of the universe
82	Water's temperature of maximum density	83	Water's heat of fusion	84	Water's heat of vaporization
85	Number density of clumpuscules in the universe	86	Average mass of clumpuscules in the universe	87	Location of clumpuscules in the universe
88	Di-oxygen's kinetic oxidation rate of organic molecules	89	Level of paramagnetic behavior in di-oxygen	90	Density of ultra-dwarf galaxies in the middle-aged universe
91	Degree of space-time warping and twisting by general relativistic factors	92	Percentage of the initial mass function of the universe made up of intermediate stars	93	Strength of the cosmic primordial magnetic field

- William Lane Craig, "Reasonable Faith", 3rd Edition (Crossway), p. 106



"A common sense interpretation of the facts suggests that a super-intellect has monkeyed with physics, as well as with chemistry and biology, and that there are no blind forces worth speaking about in nature. The numbers one calculates from the facts seem to me so overwhelming as to put this conclusion almost beyond question." *– Frederick Hoyle, "The Universe: Past and Present Reflections", Annual Review of Astronomy and Astrophysics 1982: 20: 16*

Fred Hoyle (1915-2001) British Astronomer and Science Author

A possible objection might be to say that if the constants and quantities of nature had different values, then maybe different life forms might have evolved.

But this fails to understand the true consequences of a change in the values of these constants and quantities. When scientists say a universe is life permitting, they're not talking about just the present forms of life. By "life" scientists mean the property of organisms to take in food, extract energy from it, grow, adapt to their environment and to reproduce. Anything that can fulfill those functions counts as life.

And, in order for life like this to exist, the constants and quantities of nature have to be unbelievably fine tuned. If the values found in nature had been even slightly different, not even matter or chemistry could exist, much less planets where life might evolve.

Sometimes people will use an example of a lottery in order to justify the chance alternative. In a lottery where all the tickets are sold, it’s fantastically improbable that any one particular person would win, yet somebody has to win! It would be unjustified for the winner, whoever he may be, to say, “The odds against my winning were twenty million to one. And yet I won! The lottery must have been rigged!”

In the same way, they say, some universe out of the range of possible universes has to exist. We just got fortunate and won the universe lottery that permits life.

This analogy is a misunderstanding of the argument for design. There’s actually a better, more accurate analogy we can use in its place.

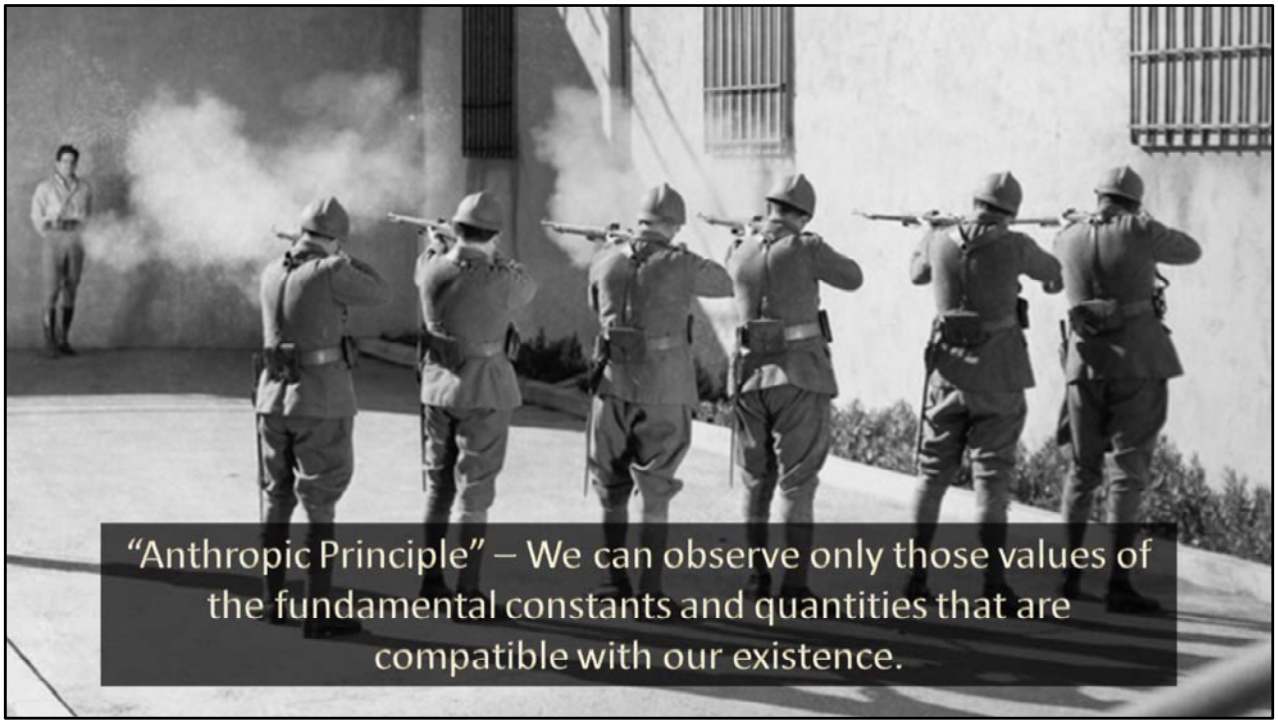
The argument for design is not trying to explain why this particular universe exists. Rather it’s trying to explain why a life-permitting universe exists. The lottery analogy was misconceived because it focused on why a particular person won. The correct analogy would be a lottery in which billions and billions and billions of white colored lottery balls were mixed together with just one black lottery ball, and you were told that one ball will be randomly selected out of the horde. If it’s black, you’ll be allowed to live; if it’s white, you’ll be shot.

Now notice that any particular ball that is randomly selected is equally improbable. This is the point illustrated by the first lottery analogy.

That point, however, is irrelevant because we're not trying to explain why this particular ball was picked. The crucial point is that whichever ball rolls down the chute, it is overwhelmingly more probable that it will be white rather than black. Getting the black ball is no more improbable than getting any particular white ball. But it is incomprehensibly more probable that you will get a white ball instead of a black one. So if the black ball rolls down the chute, you certainly should suspect that the lottery was rigged to let you live.

So in the correct analogy, we're not interested in why you got the particular ball you did. Rather we're puzzled by why, against overwhelming odds, you got a life-permitting ball rather than a life-prohibiting ball. That question is just not addressed by saying, "Well, some ball had to be picked!"

In the same way, some universe has to exist, but whichever universe exists, it is incomprehensibly more probable that it will be life-prohibiting rather than life-permitting. So we still need some explanation as to why a life-permitting universe exists.

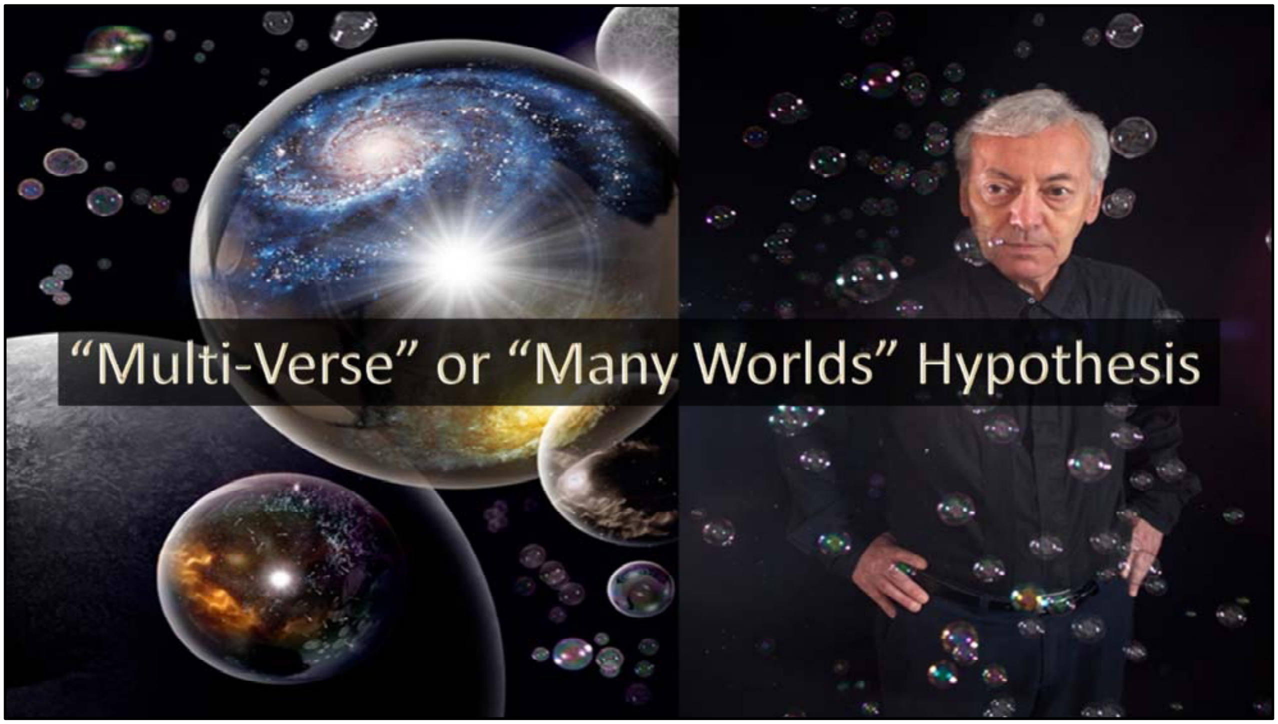


"Anthropic Principle" – We can observe only those values of the fundamental constants and quantities that are compatible with our existence.

Some people have argued that no explanation is needed for why we observe a life-permitting universe because that's the only kind of universe we can observe! If the universe were not life-permitting, then we wouldn't be here to ask about it. (This is the so-called Anthropic Principle, which says that we can observe only properties of the universe that are compatible with our existence). This reasoning is flawed.

Again, an illustration might help. Imagine you're traveling abroad and arrested on trumped-up drug charges. You're dragged in front of a firing squad of one hundred trained marksmen standing at point-blank range. You hear the command given: "Ready! Aim! Fire!" You hear the deafening sound of the guns. And then you observe that you're still alive! That all of the one hundred marksmen missed! Now what would you conclude? "Well, I guess I shouldn't be surprised they all missed! After all, if they hadn't all missed, I wouldn't be here to be surprised about it! Nothing more to be explained here!"

Of course not! It's true you shouldn't be surprised that you don't observe that you're dead, since if you were dead, you wouldn't be able to observe it. But you should still be surprised that you do observe that you're alive, in light of the enormous improbability that all the marksmen would miss. Indeed, you'd probably conclude that they all missed on purpose, that the whole thing was a set up, engineered for some reason by someone.

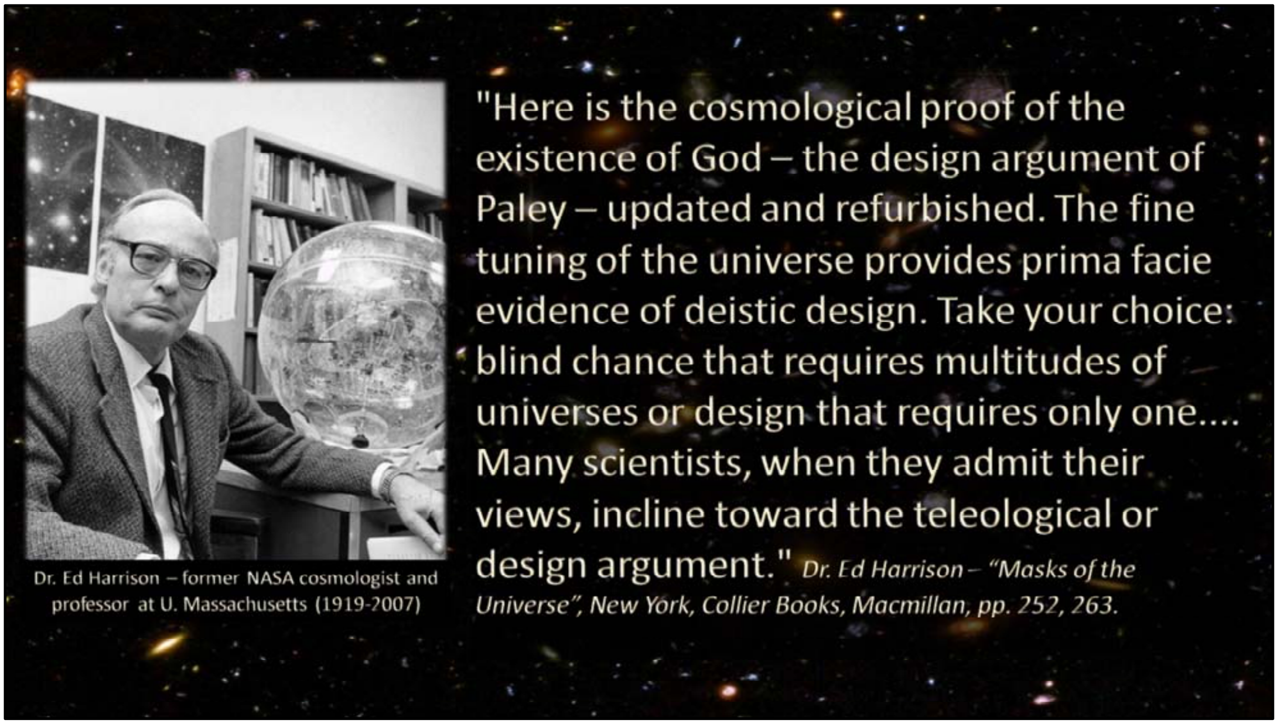


“Multi-Verse” or “Many Worlds” Hypothesis

Even the secular scientific community has come to recognize that no rational explanation can be plausibly given for the overwhelmingly long odds that the universe should be life permitting. The odds against all of nature’s constants and the arbitrary quantities present at the birth of our universe being precisely what they needed to be in order for us to exist, are inexplicable and indefensible based upon everything we currently know.

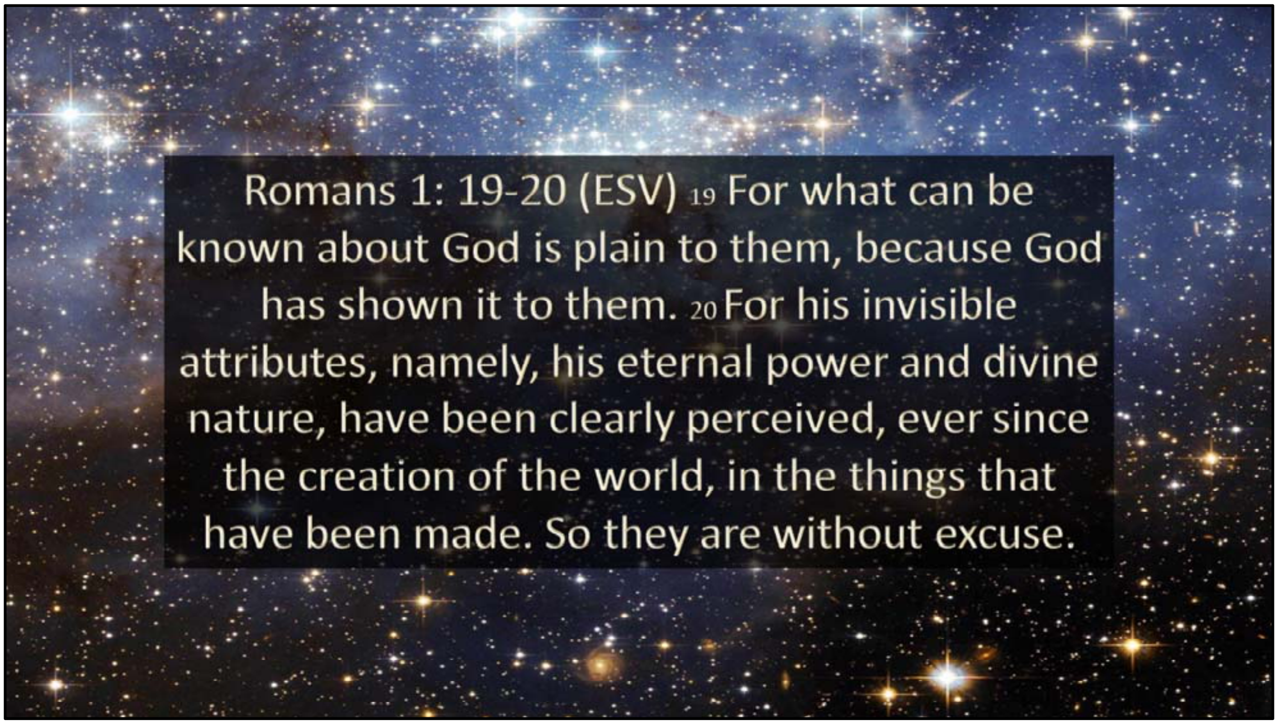
As a result, secular scientists have been forced to adopt exotic theories such as the “Multi-Verse” or “Many Worlds” hypothesis in order to explain our existence here in the face of insurmountable odds.

Yet, no material evidence exists to support any of these exotic theories. In fact, in order to accept these wildly speculative theories, one must possess what secularists accuse believers in God of possessing…blind faith!



Dr. Ed Harrison – former NASA cosmologist and professor at U. Massachusetts (1919-2007)

"Here is the cosmological proof of the existence of God – the design argument of Paley – updated and refurbished. The fine tuning of the universe provides prima facie evidence of deistic design. Take your choice: blind chance that requires multitudes of universes or design that requires only one.... Many scientists, when they admit their views, incline toward the teleological or design argument." *Dr. Ed Harrison – "Masks of the Universe", New York, Collier Books, Macmillan, pp. 252, 263.*



Romans 1: 19-20 (ESV) [19] For what can be known about God is plain to them, because God has shown it to them. [20] For his invisible attributes, namely, his eternal power and divine nature, have been clearly perceived, ever since the creation of the world, in the things that have been made. So they are without excuse.